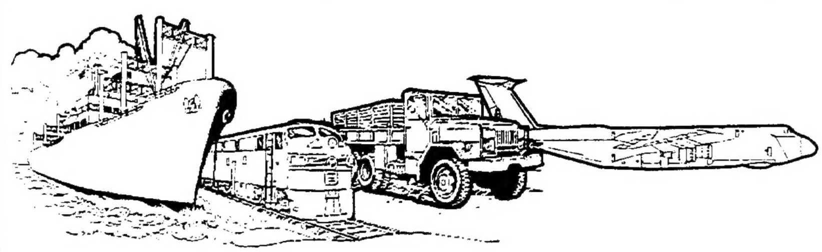
Mobility Times

VOLUME 8 JULY 1996

The Mobility Concepts Agency (MCA) periodical is published quarterly. MCA is a multi-Service organization sponsored by the Army Training and Doctrine Command (TRADOC) and the Air Mobility Command (AMC). The periodical is governed by Army Regulation 25-30, chapter 10. It is intended to be a vehicle for disseminating current mobility information and for discussing new concepts and ideas in the mobility arena. Since the periodical is an open forum, the articles, letters, and opinions expressed or implied herein should not be construed to be the official position of TRADOC, AMC, or MCA. Articles, letters, and opinions are welcome and should be sent to Mobility Concepts Agency, ATTN: ATDO-MCA, Ft. Monroe, VA 23651-5000.

Feature Articles: **Page:**



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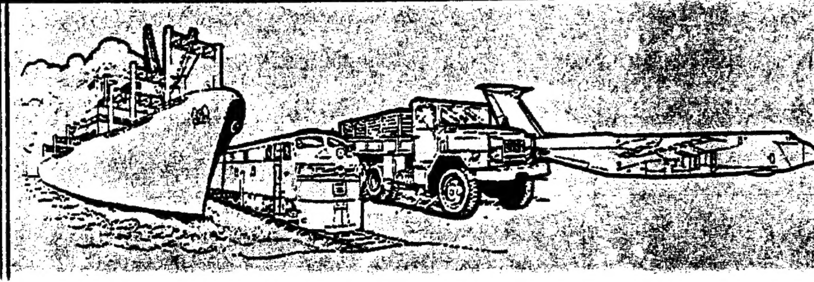

DIRECTOR'S COMMENTS

On 7-15 May 1996, MCA participated in the first CINC Joint Warfighting Support Team visit to U.S. Forces Korea (USFK) and USCINCPAC. Actually, the program got its start back in 1991 when the TRADOC Commander and the Chief of Staff, Army initiated the CINC Support Program to provide a direct Army link to the CINC's, facilitate quick and meaningful action, and to foster jointness. Although a very successful program, recent CINC comments indicated a desire to include the other Services to make the team more joint and therefore, more relevant to the CINC's needs.

The Deputy Chief of Staff for Doctrine (DCSDOC) under TRADOC worked to change the focus from "green" to "purple" and the CINC Joint Warfighting Support Program was established last Spring. Including TRADOC, the Team consists of 11 organizations, mostly joint, from the Tidewater area. As Colonel Mike Smith, Director, Joint Doctrine Directorate (JDD) under DCSDOC, stated "Its greatest significance derives from the ability it gives the CINC's warfighting staffs to dialogue directly with the agencies who are writing their joint, multi-Service and Service warfighting doctrine and tactics, training, and procedures (JTTP's)." Currently, no other forum exists in the U.S. armed forces which supports the CINC's warfighting staffs in such a manner.

The initial visit was very productive and resulted in an action plan to work/resolve six joint USFK issues and eight joint USPACOM issues. If you are interested and would like information regarding the specific issues, or the program itself, please contact the JDD office here at Fort Monroe at DSN 680-3153. We're off to a great start and are looking forward to future trips. Right now three move CINC Support trips are planned for 1996: SOUTHCOM, ACOM, and EUCOM.

One of today's hottest topics in both the transportation and operations community is something called "JRSOI" or Joint Reception, Staging, Onward Movement, and Integration. There is no official definition of JRSOI as there is no doctrine published yet but its purpose is to optimize throughput within the theater lines of communication or LOC. It starts at the aerial port/seaport of debarkation (APOD/SPOD) with the reception process, passes through the staging and onward movement phases, and ends with the integration or buildup of forces to form combat power at a time and place designated by the Supported Combatant Commander. JRSOI is the process that links strategic lift and tactical maneuver, is the responsibility of the Supported CINC, and is essentially operational in nature (a J3 function) that requires a lot of logistical support from the J4 side of the house.

As a former C-130 and C-5 aircraft commander and a deployed Tanker Airlift Control Element (TALCE) operations officer and commander, I've been on both sides of the operations/transportation spectrum and witnessed first hand the problems that can occur even in the smaller deployments. Many times I've experienced austere facilities or the lack thereof, minimum command, control, communications (C3) capabilities or assets, ad-hoc organizations, host tenant support agreements that hindered operations, and little or no in-transit visibility over what was coming or going. Often, we did not know where people and supplies were going even after their arrival. The result was lots of confusion, which was overcome by the super-human efforts of host and tenant organizations working long, difficult hours at the airhead. I speak mainly of airports, but seaports had their own chaos to deal with as well. These deployment problems I experienced in the 1980's are compounded in the 1990's because

the U.S. is now a CONUS-based force as opposed to a forward-based force. This means more airlift and sealift is required to rapidly deploy a larger percentage of our forces which creates more traffic and therefore, more opportunity for confusion during the entire deployment process, not just at the APODs and SPODs.

The most difficult part of the deployment process always seems to occur within the theater at the end of the strategic flow, that is, the interface where the intertheater airlift (strategic) stops and the intratheater airlift (theater) begins. I call this the Strategic-Theater (ST)-Interface and no matter how hard we try, a "seam" always develops somewhere along this interface. The larger or stronger the seam, the less streamlined is the flow. There is greater confusion, the process is slower, and closure time is increased. By reducing or eliminating the seam at the ST Interface (where JRSOI begins), there would be fewer problems and less turbulence during the deployment.

I feel there are two simple conditions which must exist if we are ever going to fix the deployment process in the theater. First, deployment operations must be a totally joint and/or combined endeavor. One Service can't do it on its own. Second, the deployment process must be totally seamless from fort to foxhole so that a streamlined flow exists and turbulence is minimized. By fort to foxhole I mean from fort/installation to the APOE/SPOE (CONUS LOC); from the APOE/SPOE to APOD/SPOD (strategic LOC); and from the APOD/SPOD to the foxhole (the theater LOC and RSOI part of the deployment). Of course USTRANSCOM has responsibility for the first two LOC's and the supported CINC has responsibility for the theater LOC. If a joint and seamless deployment is to occur, USTRANSCOM must understand completely the supported CINC's requirements, know where its responsibility ends and the theaters begins, and each command must have total visibility over deploying forces. This means C2 information must flow in both directions across the ST-Interface and be timely and accurate to enable the theater to predict workloads, monitor force integration (the most critical part of the JRSOI process) and provide the combatant commander with a basis for making sound management decisions under combat conditions. When all of these enablers come together there is a good chance the deployment operation is totally joint and the ST-Interface totally seamless with minimum confusion and maximum optimal flow (streamlined) as desired by the theater CINC.

Although there are numerous projects, organizations, and initiatives currently engaged in fixing or improving one or more of these LOCs, two recent initiatives in particular are very promising and should have a big impact on our ability to deploy forces rapidly in the future.

The first is the creation of a Deployment Process Special Action Group or "DPSAG" by the CJCS. The DPSAG will identify and implement deployment process improvements and will focus on short and long term issues. These are currently five deployment focus areas including crisis planning and execution, deployment training, C4, deployment infrastructure, deployment enablers, and mobilization.

The second initiative involves the deployment of JRSOI doctrine in a joint publication. MCA presented a "decision brief" to the Joint Doctrine Working Party (JDWP) on 16 April 1996 to gain official approval for the development of doctrine and selected JTTP for JRSOI. This doctrine will fill the void which currently exists between strategic deployment and joint operational doctrine. The JDWP approved the proposal and designated the Army as lead agent. TRADOC is the Primary Review Authority and MCA will be providing the literature research and writing team effort with assistance from JDD. We will have the first draft out for staffing in February 1997, a

second draft by Summer 1997 with a completed document to the Joint Warfighting Center no later than December 1997. Developing new doctrine is normally a two-year effort which we hope to complete in 18 months.

These are definitely exciting times for us transporters and logisticians. The DPSAG and JRSOI doctrine integrated with new logistics initiatives, such as the USAF's Lean Logistics and Air Mobility Express Concepts and the Army's Battlefield Distribution Operational Concept and Velocity Management Process will fully support the joint nature of future logistics operations. These initiatives coupled with a modernized infrastructure, new weapons, and logistical systems as well as emerging C4 systems (GCCS, GTN, JTAV) will have a very big impact on this Nation's capability to rapidly project our forces forward as we leap into the 21st century.

MCA certainly appreciates the articles that many individuals/organizations submit to us for publication. We realize that a lot of time and effort goes into their preparation. With this in mind, we want to thank three individuals who played a significant role in last quarters excellent article on JRSOI and JTDM system that we inadvertently neglected to mention. We want to thank Mr. Mike Williams, Mr. Mike Topp, and Mr. Tom Hill of Automated Research Systems, Limited (ARS) for the utilization of excerpts from the Theater Distribution Management Concept of Operations. I hope you enjoy this issue of the Mobility Times. Please call if you have any comments or would like to publish an article. See you next quarter.

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Secretary of the Army: Mr. Togo D. West, Jr.
Commander, Training and Doctrine Command: General William W. Hartzog

CONCEPTUAL DEVELOPMENT OF A RAPIDLY DEPLOYED PIER (RDP)

by
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Abstract

The Naval Facilities Engineering Command has been tasked to investigate the use of rapidly deployed pier (RDP) systems which would solve the problem of providing a ship berth that would allow moving cargo directly from the ship across an unimproved beach. This article is a review of the current efforts toward conceptual development such a system. The RDP system envisioned is comprised of four primary components or systems: a floating multi-deck pierhead providing ship berthing and a platform for cargo handling operations, an approachway connecting the pierhead to the shore, a cargo handling system for loading and offloading ships, and the port support facilities required to operate the system on a day-to-day basis.

Background

Both military and civilian agencies of the U.S. and other governments have expended time and effort in the development pier systems. Major military developmental efforts include the DeLong Piers used by the U.S. Army in southeast Asia, the U.S. Navy Elevated Causeway (ELCAS), and Modular Elevated Causeway (ELCAS(M)), and the British Flexiport used in the Falkland Islands. While each of these systems has provided an important improvement in the capability to offload military cargo none has solved the problem of providing a ship berth that would allow moving cargo directly from the ship across an unimproved beach.

Purpose for System

Military operations often require logistic support of expeditionary forces in locations where adequate port facilities are not available. Current methods for providing logistics support over unimproved shorelines require in-stream offload of ships to lighters, which transport the cargo either directly to the beach or to a shallow water expeditionary pier such as the ELCAS or ELCAS(M). While these methods are adequate for delivering relatively small quantities of cargo, the limitations of in-stream offloading operations and the double-handling of cargo inherent in lighterage operations are unsatisfactory for larger scale operations that require frequent offloading or modern containerships, Roll-On/Roll-Off (RO/RO) ships, and other deep draft ships bringing cargo to the operating area. Conventional permanent piers adequate to offload these types of ships cannot be constructed within reasonable timeframes for expeditionary operations and must be left behind once the operation is concluded. The fielding of a mobile, rapidly deployable and relocatable pier capable of directly offloading cargo from containerships and RO/RO ships to the beach is needed to support the highly mobile military forces demanded by current doctrine. The RDP will fill this need.

Mission Profile for RDP

The RDP mission is to expeditiously provide temporary deep water port facilities for deep draft ships in areas where adequate port facilities do not exist. These include circumstances where existing and available port facilities have been damaged or do not

provide enough draft or pier space, where no port facilities exist at all, or when operationally the best point of entry is determined to be across an unimproved shoreline. The RDP will arrive at the theater of operations as part of the Assault-Follow-On-Echelon (AFOE), usually arriving in the Amphibious Objective Area (AOA) by D+5. The RDP will typically be used to support joint operations. The system will be installed and operated primarily by Navy and Army personnel who are part of the AFOE. A typical RDP installation will remain in place for approximately one year. The RDP may be an asset of the Maritime Prepositioning Force (MPF), or an Army deployable asset. The RDP will be retrieved once an operation is completed, refurbished and prepared for redeployment and installation when required next.

System Description

The RDP system is comprised of four primary components or systems: a floating multi-deck pierhead providing ship berthing and a platform for cargo handling operations, an approachway connecting the pierhead to the shore, a cargo handling system for loading and offloading ships, and the port support facilities required to operate the system on a day-to-day basis. The system design is geared toward full self-deployment to the AOA, with all equipment and components loaded on board the multi-deck barge that makes up the pierhead. The barge will be towed to the site by ocean-going tugs that will be used at the RDP to assist cargo ships during berthing and mooring operations. If the design goal for full self-deployment cannot be met, components and equipment that cannot fit on the barge will be transported to the AOA on a ship readily available to the U.S. Armed Forces. If additional transport space is required, only partial space on one ship, in addition to its own self-deployment capability, should be required for transport. The system concept is illustrated in Figure 1.

Each principal component or subsystem of the RDP in its current stage of development is described below in further detail.

Pierhead Description

A floating multiple-deck barge nominally 290 meters long and 32 meters wide will be used for the pierhead facility. The multiple-deck feature of the pierhead will increase the area available for port operations and temporary cargo holding, and provide additional options for providing advantageous ramp access for different RO/RO ships.

The floating pierhead will be moored at the shoreward end (bow) to a single point mooring (SPM) by a yoke structure (Figure 2) or comparable mechanism. The SPM will be secured to the seafloor by an expedient anchoring system. The stern of the barge will be moored from two catenary lines connected to drag embedment anchors or additional SPM's. The aft moorings will be designed to prevent entanglement with ships berthing or moored to the pierhead. While the forward SPM will be designed with a tight watch circle to minimize motion, the aft moorings will allow some degree of movement. This compliant mooring design will reduce the stresses to be resisted if the pierhead were designed as a rigid, fixed structure. The mooring system selected also has the advantage of providing for quick disconnection in the event of impending severe weather, enabling the pierhead to ride out the storm in a safer environment. Quick reconnection will enable operations to resume soon after the storm has passed.

The design of the pierhead, SPM and aft moorings will allow the flexibility of positioning the pierhead either parallel or perpendicular to the approachway, selecting the best configuration for withstanding the environmental characteristics of the site. This would be beneficial in areas where the environmental loads from a longshore current are expected to be significantly greater than

Figure 1: Rapidly Deployed Pier (RDP) System Concept

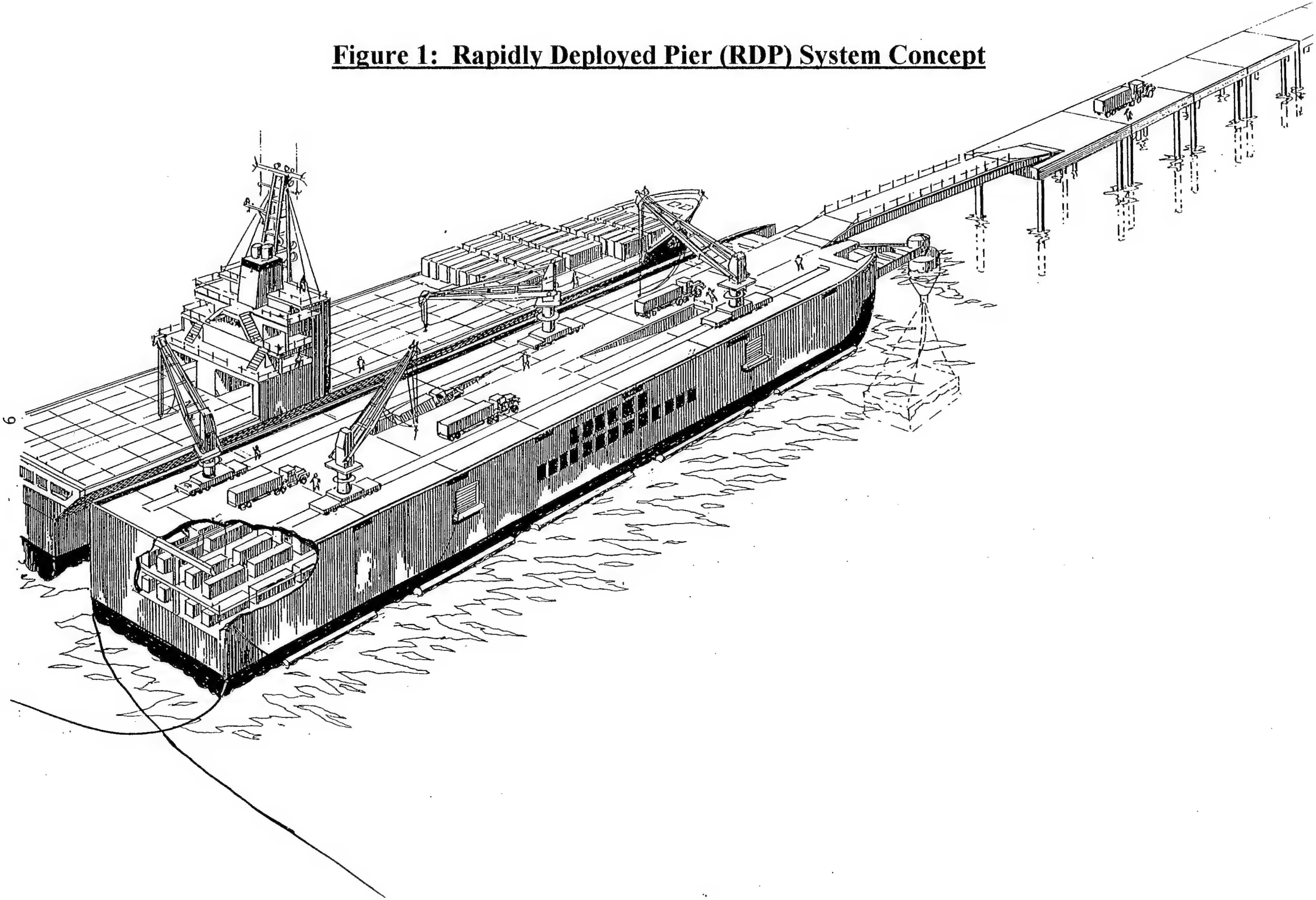
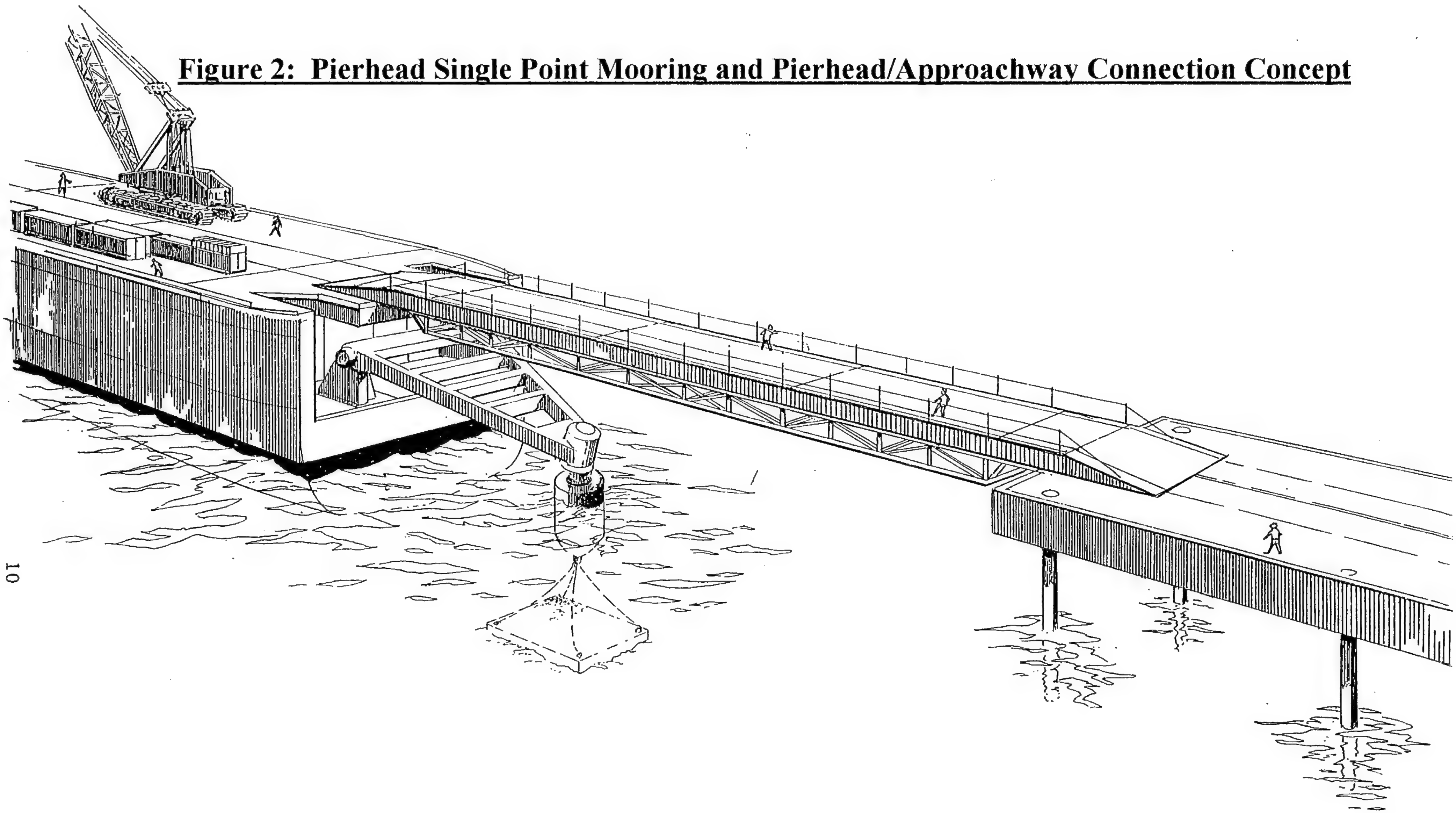


Figure 2: Pierhead Single Point Mooring and Pierhead/Approachway Connection Concept



those from the seas. The flexible installation scheme will allow the RDP to withstand greater longshore current loads than if required to remain perpendicular to the shore. This arrangement also will provide a sheltered lee for vessels berthing on the nearshore side of the pierhead, if desirable. Adjustment of the orientation over a 90 degree arc also will be possible once installation is complete, allowing the orientation to be optimized for the prevailing environmental conditions as they change over the duration of the installation.

The floating pierhead design provides that operations will not be impacted by tidal fluctuations, since the pierhead and ships will be subject to the same tidal variations, and is not impacted by seafloor slope or soil conditions in the vicinity of the pierhead. Once the SPM is installed, the pierhead can be moored in place and be ready to berth ships, if needed, while approachway construction continues. This will provide an interim capability for offloading ships to lighterage for transport to the shore, while approachway construction is completed.

Both sides of the pierhead will be equipped with mooring and fendering systems capable of berthing ships up to 328 meters in length. The pierhead will be equipped with powered winches to assist mooring operations. The sea-going tugs used for initial transport of the RDP system will be used throughout the operating period for the RDP to assist in berthing and mooring operations.

A similar pierhead system has been in use since 1976 in Indonesia (Remery, 1985), providing offshore LPG storage facilities for Pertamina, the Indonesian national oil company. That system is located 32 killometers offshore in 43 meters of water, and is designed to withstand 100-year storm conditions as well as gas tanker mooring loads under sea state 4 to low sea state 5 conditions (Smulders, 1985).

Cargo Handling System

The cargo handling system on the pierhead will consist of four pedestal cranes, all mounted on one side of the pieirhead. The cranes will be built into the barge structure, requiring no assembly or lengthy preparation prior to operations once the pierhead is moored at the site. An advanced container lifting technology, utilizing laser positioning of a spreader bar capable of six degrees of freedom motion to match the motions of the container onboard a moving vessel, may be incorporated into the cargo handling system design to enhance operability in higher sea states. Both sides of the pierhead will be designed to accept offloading ramps from all RO/RO ships expected to utilize the RDP. The pierhead will accommodate both stern and side ramps. Because the pierhead is floating, tidal fluctuations will not impact RO/RO operations. Container offloading capability is expected to be 800 containers/day, based on simultaneous offload of two containerships, using a minimum of two cranes. RO/RO offloading capability is expected to be 2400 vehicles/day, based on simultaneous offload of two RO/RO ships.

Approachway

The approachway connecting the pierhead to the shore will be elevated over its entire length, and construction will proceed simultaneously from the beach and pierhead to accelerate installation. The approachway will be constructed using a cantilevered construction method, eliminating the impact of sea state on installation operations. The nominal length of the cantilevered spans will be 18 meters and the width 8 meters to allow two-way traffic during throughput operations. Spans will be supported by steel pipe piles.

Once the pierhead is secured in its mooring, a special seaward end start-up section will be installed, using the pierhead and its cranes as a construction platform. From the initial start-

up platform, cantilevered construction of the approachway towards the shore will continue. A special bridge span, launched from the pierhead, will connect the floating pierhead to the first seaward section of the approachway. The connection between this transition bridge span and the floating pierhead will be designed to follow any horizontal or vertical movement of the pierhead in its moorings. Because of the size and mass of the pierhead, motions should be small and very low frequency, minimizing any impact to traffic movement across this bridge span.

The construction of the approachway from the beach towards the pierhead (Figure 3) uses the same cantilevered construction method as from the pierhead. Beach construction equipment and components will be transported to shore using lighterage once the loaded pierhead arrives at the site. Precise surveying and leveling tools will be used to ensure adequate alignment between the two segments of the approachway. When the two segments are within one span length of closure, a special double-width section will be installed to close the gap. The double-width feature of this last section will provide a pull-out area for disabled vehicles and also a passing area to allow oversized vehicles to pass on the approachway.

Port Support Facilities

The RDP design will include consideration of the basic port support facilities required for day-to-day operation of the system. These include vessel assist for cargo ships berthing and mooring, shops and operations/maintenance areas and facilities, transient storage for container offloading operations, administration and port control, berthing and messing for operating personnel, and utilities services. It is currently envisioned that the basic concept for the RDP include only the pierhead equipped to rapidly offload breakbulk, containers, or rolling stock. Other RDP enhancements can be added as the facility matures.

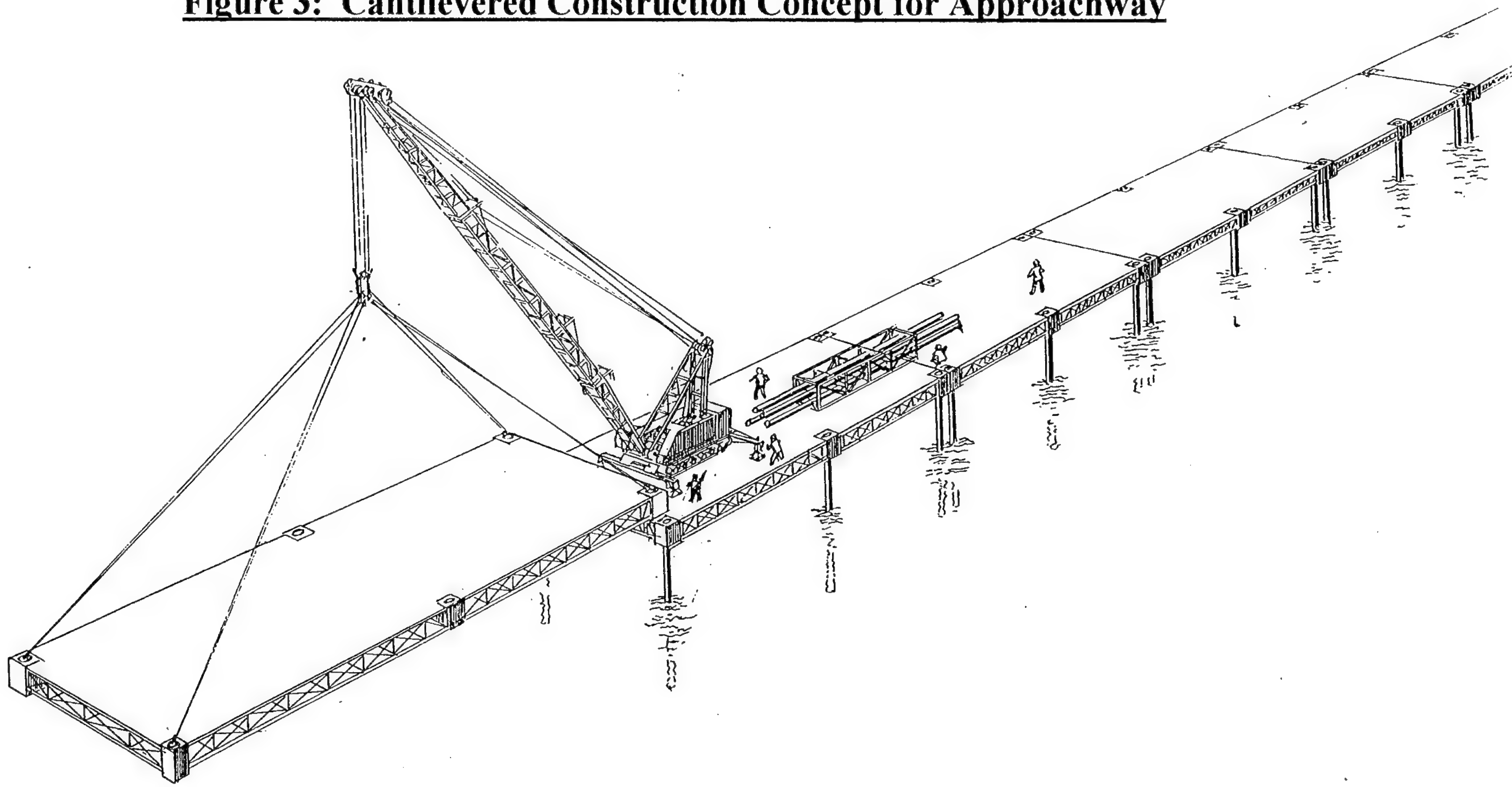
System Deployment

The current design goal is for full self-deployment of all equipment and components required for installation and operation of the RDP. Equipment and components will be loaded on the ocean-going multi-deck barge that will ultimately form the pierhead at the installation site. The barge will be towed to the installation site using two ocean-going tugs. At nominal tow speeds of 18.5 km/hr, the RDP system can be in the objective area ready for installation in a matter of days after the assault. Commercial barge operators have successfully conducted tow operations worldwide with large, heavy loads, and practicality has been well established. If the design goal for total self-deployment of the system on board the pierhead/barge cannot be met, any additional cargo that exceeds the storage capability of the barge will be transported on other available shipping. Only partial capacity of one additional ship would be required in this case. The construction sequence described in the following section includes approachway construction occurring simultaneously from the beach out to the pierhead and from the pierhead to the shore. To facilitate the start of construction auxiliary shipping, if needed, will be loaded with those components required for installation of the SPM, stern moorings pierhead, and the section of approachway built form the pierhead to shore, stored on the pierhead/barge. This will separate the two operations and enable beach component offload to commence without hindering critical SPM and pierhead installation operations.

Construction Sequence

Prior to the RDP system equipment arriving at the AOA, it is assumed that the area will be secured and preliminary site survey information will have been collected to identify the optimal site for the system, and the minimal beach preparation required for installation will be underway or completed.

Figure 3: Cantilevered Construction Concept for Approachway



Beach preparation will consist of minimal grading and the placement of beach matting if required for construction equipment, dependent on the beach soil characteristics. Once the RDP system gear has arrived at the AOA, three operations will begin concurrently from the pierhead/barge. The SPM will be installed from the barge, with the assistance of the towing tugs. At the same time, using other pierhead cranes, the start-up section of the seaward end of the approachway will be installed and cantilevered construction of the approachway will continue towards the shore. Concurrent with these operations, equipment and components required for beach-side construction of the approachway will be offloaded from either the barge or the ship transporting the remaining RDP gear, if needed. Beach-side construction of the approachway will begin immediately. Offshore, once the SPM has been installed, the stern mooring system will be installed and the pierhead secured. With the pierhead secured, preparation of the cargo crane and other critical pierhead facilities can start at any time. The bridge/ramp linking the pierhead to the seaward end of the approachway will be secured to both the pierhead and approachway as soon as approachway construction allows. Once the two simultaneous approachway construction operations are within a span length of each other, the final connecting span is installed. Based on experience with similar systems, cantilevered construction of 915 meters of approachway is estimated to take between seven and nine days, depending on seafloor soil conditions and seafloor slope. Because the concept described includes simultaneous construction from both ends, installation of the entire RDP system is feasible within seven days, again depending on seafloor conditions.

Conclusion

The RDP will consist of a large floating module that forms a floating pierhead, a single point mooring buoy to anchor the pierhead and a causeway from the anchor point to the beach. The floating pierhead and other subsystems can be used to replace conventional piers, wharves, and waterfront facilities, and have the additional attribute that the pier can be disassembled into components which are transportable, and thus the facility itself is relocatable. This would provide the capacity to augment existing bases both in the U.S. and overseas and establish forward logistics support bases. In addition, the flexibility afforded by a relocatable system would permit movement of facilities as priorities and commitments change.

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Biography

Ms. Michele Murdoch is the Project Leader for the Rapidly Deployed Pier project at NFESC. She is a Civil and Coastal Engineer in the Amphibious Systems Division and has been with NFESC (and the former NCEL, Naval Civil Engineering Laboratory) since 1983.

Mr. Glenwood Bretz is the Director of the Amphibious Systems Division at NFESC, and has had extensive experience in expeditionary and portable port concepts and designs in his work at the NFESC (and former NCEL) since 1979.

TRANSPORTATION COORDINATORS' AUTOMATED INFORMATION FOR MOVEMENT SYSTEM II (TC AIMS II)

by
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Ms. Renee Rede'
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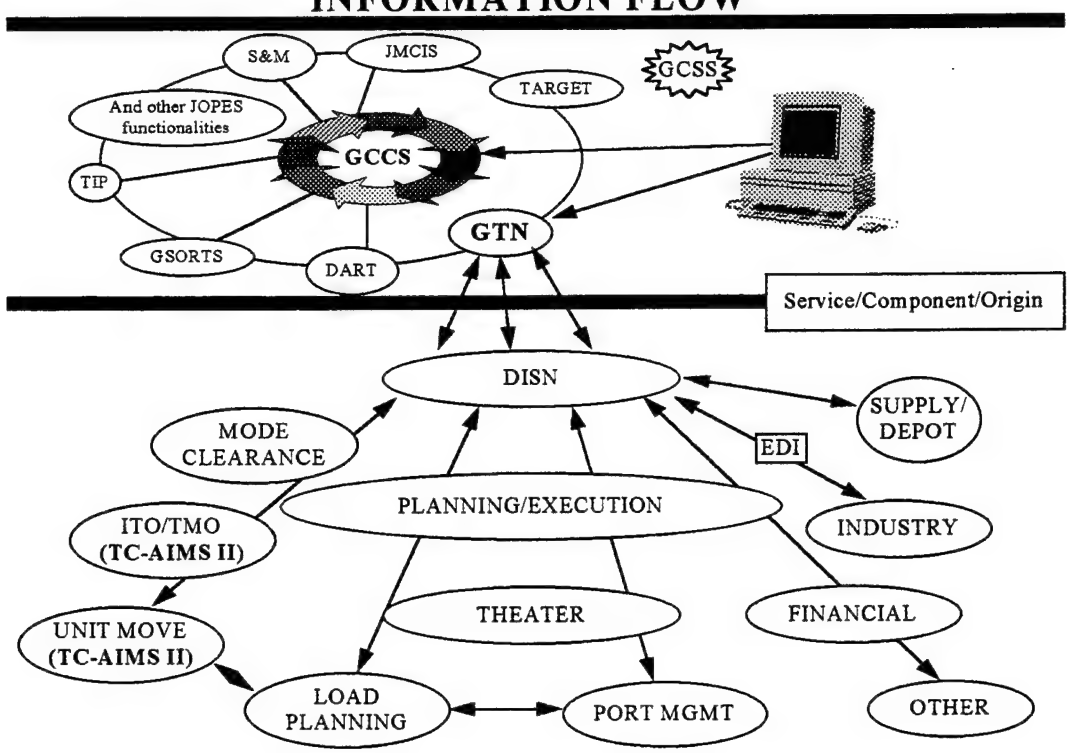
Introduction

This article provides a general overview of the Transportation Coordinators' Automated Information for Movements System II (TC AIMS II). It begins with a background of events leading to the decision to create throughout the Department of Defense (DoD) a single, effective, and efficient Automated Information System (AIS) which performs transportation management for movement of units in contingencies, and passengers and cargo in day-to-day operations. TC AIMS II is an Office of the Secretary of Defense approved corporate information management migration system that operates within the Defense Transportation System. It is designed to enhance the force projection capabilities of the United States by improving intransit visibility (ITV) and transportation planning. The article includes a discussion on TC AIMS II system development and gives an overview of past, current, and future efforts to develop this joint transportation system. Figure 1 is an illustration of the planned information flow for defense transportation systems.

Figure 1

TRANSPORTATION MIGRATION SYSTEMS INFORMATION FLOW



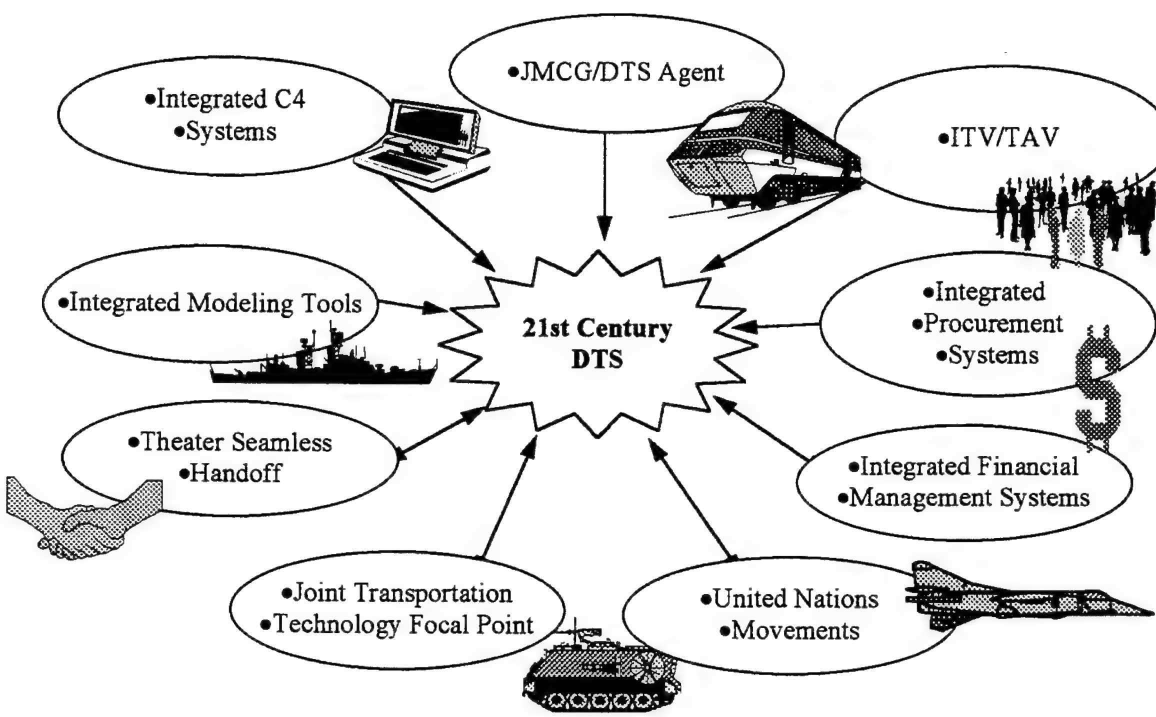
Background

Advances in AIS have given the DoD the capability to maintain ITV over all materiel and personnel moving from depots and garrisons into a theater of operation. TC AIMS II is a key element in the Defense Transportation Systems (DTS) for handling the movement of personnel and cargo; both unit and non-unit, for deployments, redeployments, and retrograde operations. This means that TC AIMS II will become a vital element of the Joint Reception, Staging, Onward Movement, and Integration (JRSO&I) strategy to improve force projection.

The United States Transportation Command (USTRANSCOM) was given the lead in developing Total Asset Visibility (TAV) and ITV policy. The ongoing efforts of USTRANSCOM's Joint Transportation Corporate Information Management (CIM) Center (JTCC) to develop standardized transportation business practices is one of the leading drivers of TC AIMS II functionality. The Army is the lead agency for the development of TC AIMS II and the Program Executive Office for Standard Army Management Information Systems (PEO STAMIS) is providing acquisition, management, and funding support. Secretary of Defense Perry's 13 October 1993 memo directed accelerated effort towards a horizontal and vertical integration of Defense Transportation Systems. The memorandum provided guidance to migrate systems, transportation process improvement, and data standardization. TC AIMS II is a direct result of implementing this memo as it incorporates the best of legacy systems, and eliminates "stove pipe" systems. Figure 2 illustrates TRANSCOM's strategic objectives for DTS.

Figure 2

USTRANSCOM STRATEGIC PLAN OBJECTIVES



The TC AIMS II system is created to correct the joint problem of each DoD component having a non-integrated "stove pipe" transportation system. The TC AIMS II design incorporates the best parts of each component's transportation system and the unique needs of each Service to create a joint transportation system. With this in mind, the mission statement of TC AIMS II is: Support DoD mission accomplishment by providing all DoD unit and installation Transportation Officers/Installation Transportation Offices (TO/ITOs) with a single totally integrated transportation management AIS. This AIS will improve capabilities of TO/ITOs to plan and execute movement of unit and non-unit passengers and cargo to accomplish the entire spectrum of missions required to overcome new threats and exploit new opportunities.

System Design

Operational Environment

TC AIMS II will be deployed at DoD units and installations worldwide. The system will be capable of worldwide deployment and operations in a client-server and stand alone mode. The software will reside on tactical and commercial IBM compatible personal computers. The system will be capable of being integrated through multiple communications modes to TC AIMS II servers established worldwide at selected DoD installations. This worldwide communications capability provides the backbone for TC AIMS II ITV.

Functional Process

TC AIMS II performs two principal functions: Unit Movement and Installation Transportation Officer (ITO)/Traffic Management Officer (TMO) operations. The Unit Movement and ITO/TMO division recognizes the different transportation and planning requirements that units and installations have, while maintaining the capability for a close integration of their efforts. TC AIMS II is specifically designed to support the expeditionary nature of today's Armed Forces. It is therefore capable of operating in the Unit Movement or ITO/TMO mode in any theater of operations.

Unit Movement. Planning, preparation, and execution of unit movements are overlapping, iterative, and continuous requirements during military transportation operations. The functions in Unit Movement are designed to support all phases of unit deployment, redeployment, and retrograde operations regardless of the size or service or the unit. An additional function supported by Unit Movements is Preposition Operations. TC AIMS II will have the capability to plan and track equipment as it is moved and transferred from storage locations on land or on ship to units responding to a contingency or exercise.

ITO/TMO Operations. ITO/TMOs are the focal point to satisfy customer requirements at the installation level. TC AIMS II provides a single, formal point of entry for all DTS customers into the joint transportation arena whether in peace or war. Through a common distributed TC AIMS II system, and a consistent set of transportation policies and procedures, ITO/TMOs will be enabled to provide a consistent flow of requirements and a seamless transition from routine to contingency operations.

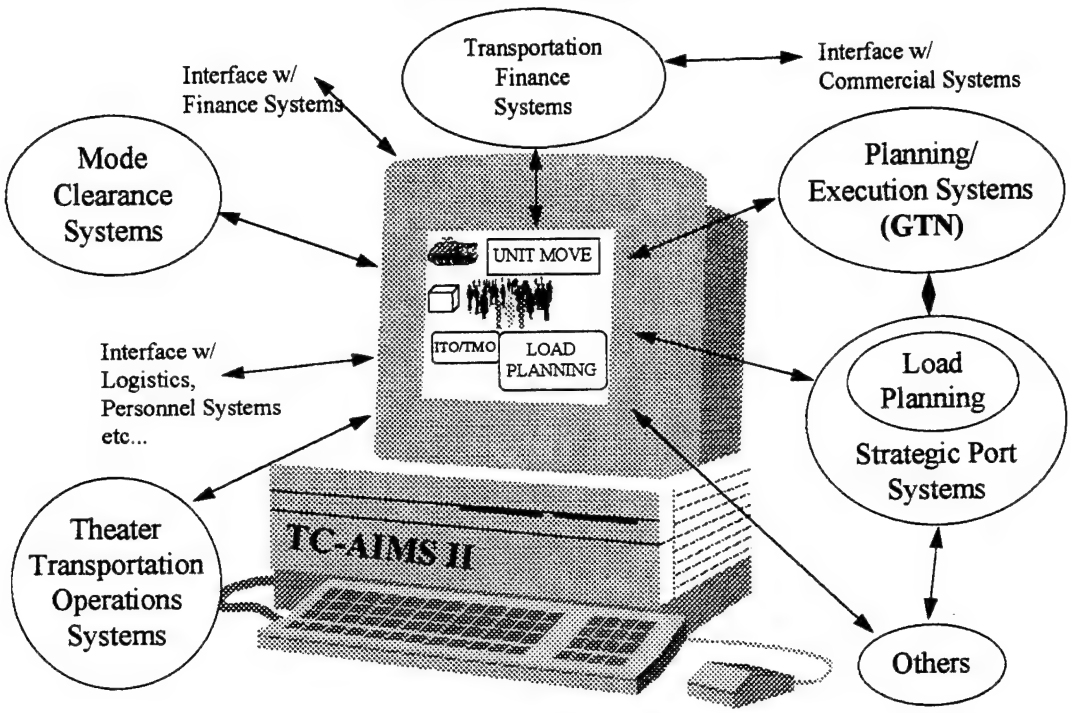
Concept of Operations

All DoD unit TOs and ITOs will process unit movement and ITO/TMO transportation requirements utilizing TC AIMS II. Depending on the responsibilities and functions needed at a specific location, the transportation officer will access the required functionality in TC AIMS II. The system ensures proper data for a particular transportation process is input, and the data output from the process is routed to the proper location. TC AIMS will have the internal capabilities to accomplish convoy planning, rail load planning, and rail car stow

planning. The system also supports afloat preposition forces for the Army, Marine Corps, and Air Force. TC AIMS II also provides easy access by the passing of data to and from the Airlift Loading Module (ALM) for aircraft plan loading, and the Integrated Computerized Deployment System (ICODES) for ship plan loading. The Global Command and Control System (GCCS) will be able to pass and receive information to TC AIMS II through the use of the Global Transportation Network (GTN) and the Joint Force Requirements Generator (J-FRG). Figure 3 illustrates the TC AIMS II concept.

Figure 3

TRANSPORTATION MIGRATION SYSTEMS
TC-AIMS II -- CONCEPT



Capabilities

TC AIMS II will embody all current capabilities of the existing DoD components' multiple transportation systems on an integrated AIS platform that is capable of operating in a client-server or stand alone mode either in garrison or deployed. In garrison, TC AIMS II will utilize the Defense Information Systems Network (DISN) to connect to a full range of Government controlled and secure communication networks to transfer data to support the warfighters' secure data transfer requirements. TC AIMS II will be able to connect to local or remote servers located on the installation or at a Mega-Center. The system will be capable of downloading in its entirety, or by specific modules, to a laptop computer, along with the units' equipment and personnel databases. The system and data are then ready to deploy to remote worldwide locations. TC AIMS II supports onward movement of the unit, and the units return to it's installation by providing transportation planning, execution and data transfer tools, making the system supportive of the RSO&I process.

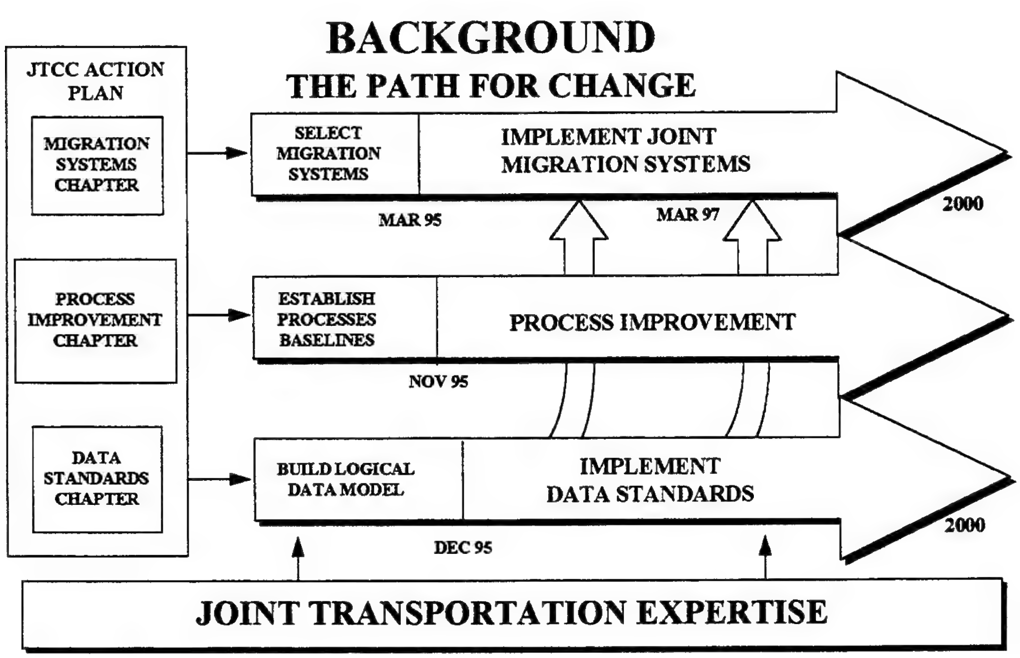
TC AIMS II will be capable of processing shipment information received from the Military Traffic Management Command port systems. It will also track containers and

pallets by applying and reading a variety of Automated Information Technology (AIT) devices, such as Logistics Applications for the Marking and Reading of Symbols (LOGMARS), Smart Cards, or Microcircuitry Technology in Logistics Applications (MITLA) devices. TC AIMS II will generate documentation for deploying, redeploying, and retrograding personnel, unit, and non-unit cargo. It will also provide information for intra and inter theater movements using a two-way interface with the Global Transportation Network (GTN). Most importantly, TC AIMS II will be capable of being deployed to any theater with supporting load planning systems. It will then function for the Theater Commander as the deployed unit movement and ITO/TMO aerial and seaport automated information system to control and plan day-to-day passenger and cargo operations.

Because of logistics interdependencies, today's DoD transportation systems must interface with commercial systems, as well as allies and NATO transportation systems. TC AIMS II will be capable of preparing movement documents in the language of the host nation. The system will also support other DoD functional area requirements such as logistics and financial management. To enhance operations with commercial enterprises, TC AIMS II will expand the use of Electronic Data Interchange (EDI) and Electronic Commerce (EC) for business transactions. The use of EDI and EC enhances the capability to rapidly transfer information from the government to the private sector and improve asset visibility and financial accountability.

In operations, TC AIMS II will support both garrison and forward deployed locations in either a networked or stand alone-mode. The system is designed to operate at the UNCLASSIFIED level, but will be capable, in the stand alone mode, of processing classified data when operated from a classified site. The system will contain multiple levels of access control ensure that sensitive information is not compromised.

Figure 4



Past Development

Because of its mission to improve the business process, the JTCC took the initial lead in gathering service requirements. These initial requirements for a joint transportation system became part of the criteria for selecting migration candidates. Because of the complexity of the transportation problem, the JTCC decided that no one service system was capable of providing the envisioned capability for TC AIMS II. The Unit Movement module, the Marine Corps Marine Air Ground Task Force (MAGTF) Deployment Support System II (MDSS II) and TC AIMS were selected. In addition, the rail load planning of Transportation Coordinator Automated Command and Control Information System (TC ACCIS), and the convoy planning of Department of the Army Movement Management System-Redesign (DAMMS-R) were also selected. The ITO/TMO module will be developed from the Air Force Cargo Movement Operations System (CMOS).

Prior to the start of developing TC AIMS II, the JTCC decided to develop and demonstrate a TC AIMS II prototype. By December 1995, the TC AIMS II Joint Program Management Office developed of a Technical Proof of Concept (TPOC). The TPOC showed a selected subset of unit and installation level transportation functionality, and demonstrated that a single transportation system could meet joint needs. Lessons learned and initial developmental code provided a jump start for design and implementation of the initial TC AIMS II. Figure 4 provides a top level view of the plan for developing TC AIMS II.

Current Development

The objective of the current development plan is to create a TC AIMS II deployment/redeployment subsystem to support unit movement, and an ITO/TMO module to support installation processes. The deployment/redeployment subsystem is to be created by migrating Marine Corps TC AIMS and MDSS II, and Army functionality for rail load planning, rail car loading, and convoy movement. The ITO/TMO process will be created by migrating the Air Force CMOS to TC AIMS II.

To maintain interoperability with other joint and automated transportation systems such as selected logistics and command and control systems, TC AIMS II will move toward compliance with the Defense Information Systems Agency (DISA) open system architecture. Documentation will use a tailored MIL STD 498 format and DoD 8120. The DISA Technical Architecture Framework for Information Management (TAFIM) will guide development of system architectures and methodologies that satisfy requirements across mission and functional areas. The Defense Information Infrastructure (DII) Common Operating Environment (COE) will be used to give a graphical user interface similar to other systems using the GCCS architecture. The DII COE will assist in easing training requirements and enable different development teams to work concurrently on TC AIMS II and produce modules that can easily be integrated. Data communications will use the Defense Information Systems Network (DISN).

TC AIMS II will consolidate the tables, reference files, algorithms, technical data files and data elements based on CMOS, TC AIMS, MDSS II, TC ACCIS, and DAMMS-R. This coordinated database will become the common database for all TC AIMS II development. Oracle will be the client-server database for TC AIMS II. The database will address the data access needs from multiple systems, joint service requirements, the minimum mandatory data elements needed for Government Bills of Lading (GBL), Transportation Control and Movement Document (TCMD), EC/EDI, and other interface requirements.

TC AIMS II will be able to import and export Army Type Unit Characteristics (TUCHA) and Equipment Characteristics Records (ECR). The system will also be able to interface with the following systems:

ALM	Airlift Loading Module
ATLASS	Asset Tracking Logistics and Supply System
CFM	CONUS Freight Management System
GOPAX	Group Operational Passenger System
GTN	Global Transportation Network
HOST	Headquarters On-Line System for Transportation
ICODES	Integrated Computerized Deployment System
J-FRG	Joint Force Requirements Generator
MDSS II	Marine Air Ground Task Force (MAGTF) Deployment Support System II
PRAMS	Passenger Manifesting and Reservations System
TC AIMS	Transportation Coordinators' Automated Information for Movement System (USMC)
TCACCIS	Transportation Coordinator Automated Command and Control Information System
WPS	Worldwide Port System

The initial unit movement capabilities of TC AIMS II will provide the logistician a broad range of tools to plan, manage, and communicate transportation requirements. The system will have an automated unit movement planning and execution capability, to include convoy planning and management. TC AIMS II will be able to provide automated assistance for the management of passenger and cargo operations in peacetime and contingency, while in garrison or deployed. It will be possible to capture data through the use of various AIT devices. ITV will be enhanced by passing critical transportation data to GTN and other command and control systems at various command levels.

The Installation Transportation Office will also receive tools for the ITO/TMO module of TC AIMS II. The system will provide an automated traffic management capability to military installations. The ITO will have an EC/EDI capability to interface to commercial carriers. The user will also receive a load planning capability for rail transport. As the single DoD system for installation level unit movement and traffic management, training, and joint integration requirements are greatly eased.

Since the current development of TC AIMS II will produce only an initial operating capability, there will be an on-going need to generate, collect, analyze, validate, and integrate new requirements. These requirements will be generated by the JTCC and system users, and passed to the Joint Requirements Office. The JTCC as part of its mission to continuously improve the transportation process is a critical requirements generator. A beta version of TC AIMS II initial operating capability is expected to be released by November 1996.

Future Development

TC AIMS II future development is based on improving the initial operation capability. As the drive by DoD continues for greater efficiency and cost savings, there will be a need to migrate other legacy systems to TC AIMS II. After the limited IOC

implementation, there will be an immediate need to modify the system by incorporating modifications and enhancements originating from field users.

TC AIMS II will continue to incorporate technology improvements, such as more advanced AIT devices and better computers. As computing power grows, TC AIMS II will become more graphical to provide an intuitive user friendly system that will ease training requirements and improve usage. The system will also include terrain maps, ship and place drawings to improve the capability for logistical planning and execution.

Interfaces and interoperability will continue to be improved, including the eventual interface of TC AIMS II with the Logistics Anchor Desk (LAD) and the Joint Total Asset Visibility (JTAV) system. Those interfaces, coupled with an interface to GTN and tie into GCCS, will enable a near seamless transfer of ITV data and transportation requirements. TC AIMS II will improve our capability to operate with allies through the transfer of data to NATO and other allied transportation systems.

Other benefits that accrue to DoD include standardization of database models and data dictionaries, and compliance with the DISA open system architecture. An open system provides the warfighter with interoperability to other command and control systems currently under development.

Over the next 15 years, it is expected that the migration and elimination of other transportation systems will lead to a cost avoidance of $3.6 billion, and a cost savings of $400 million. The end result is an estimated savings of $4 billion. This significant savings produces a return on investment that justifies TC AIMS II as the single DoD transportation system.

Continual improvement of the TC AIMS II and the migration of other systems will yield improved readiness and enhanced warfighter support to deploy worldwide in the support of any type of contingency. The system will significantly improve the ability to deploy, sustain, redeploy, and support forces in day-to-day and contingency operations. As the single deployable transportation system, TC AIMS II will provide timely and accurate source data to GCCS and GTN. This data will provide force closure and ITV/TAV visibility for various levels of command. Accurate source data will provide the capability to plan for the optimum throughput at both aerial and sea ports. TC AIMS II is a joint system that maximizes functionality while reducing costs.

Summary

The goals of TC AIMS II development is the creation of the first truly joint automated information systems for transportation management which meets the needs of all services in a single standard system. The system will give the joint planning and execution communities a tool to more efficiently plan and manage units movement to worldwide locations. When a unit deploys, it will take the automated capability to support on going transportation and logistical requirements and will have global asset visibility.

Point of Contact

The point of contact for further information is the TC AIMS II Acting Project Manager, Mr. Stan Polonsky, (703) 275-6066.

Biography

William Boden is the Director of Logistics Systems for Stanley Associates, and a Principal Information Engineer for the TC AIMS II program. Mr. Boden served as a Marine supply and

logistics officer in a variety of billets in CONUS and overseas. He is currently a reservist serving as a supply analyst at Headquarters Marine Corps.

Renee Rede' works for Stanley Associates as the Program Manager for the Unit Move Module of TC AIMS II. Ms. Rede' was the Project Manger for the United States Marine Corps LOG AIS program. She has extensive joint logistics and transportation experience as either a project manager or technical task leader.

IMPROVED CARGO HELICOPTER: THE NEXT STEP FOR U.S. ARMY CHINOOKS

by
Mr. Jim Winkeler, Program Manager
U.S. Army CH-47D Modernization

Although it is hard to believe, the first Boeing CH-47D Chinooks, which entered Army service in 1982 following comprehensive modernization in the Ridley Park, PA, factory of Boeing Defense and Space Group, Helicopters Division, are approaching the end of their projected service lives.

The Army expects to keep CH-47Ds fully operational over about 5,000 flight hours through 20 years. Beyond that threshold, operating and maintenance costs tend to rise steeply, and keeping the entire Chinook fleet fully mission capable becomes more difficult and prohibitively expensive.

Therefore, after 2002, the 20th anniversary of the CH-47D modernization program, Chinook fleet availability will begin to diminish. But the Army cannot allow this to happen for two compelling reasons: first, the heavy-lift requirement the Chinook fulfills will, if anything, increase in the future; and secondly, the Joint Transport Rotorcraft (JTR) program, slated to replace both the CH-47D and the CH-53 in the Navy and Marine Corps, is not scheduled to appear until 2015 at the earliest.

Clearly, something must be done to keep the Chinook fleet operating until the JTR can take over. The Improved Cargo Helicopter (ICH) program addresses that vital need.

For this reason, ICH is no longer merely a Boeing proposal. The Army has embraced the need for another Chinook modernization effort to meet its heavy-lift requirement.

The Army has yet to finalize the elements of the ICH program, but the proposal currently under consideration for the FY98-03 Program Objective Memorandum (POM) is slated to be a two-track effort to take the Chinook into the 21st century.

First, we will increase Chinook engine performance, making more powerful Allied Signal (formerly Lycoming) engines, comparable to those on the MH-47E Special Operations Chinooks and International CH-47Ds, the new standard for the entire U.S. Army CH-47 fleet. We can accomplish this task by upgrading existing engines to a new T55-GA-714A model, increasing performance by 22 percent, (more than 4,000 continuous shaft horsepower) over the current T55-L-712.

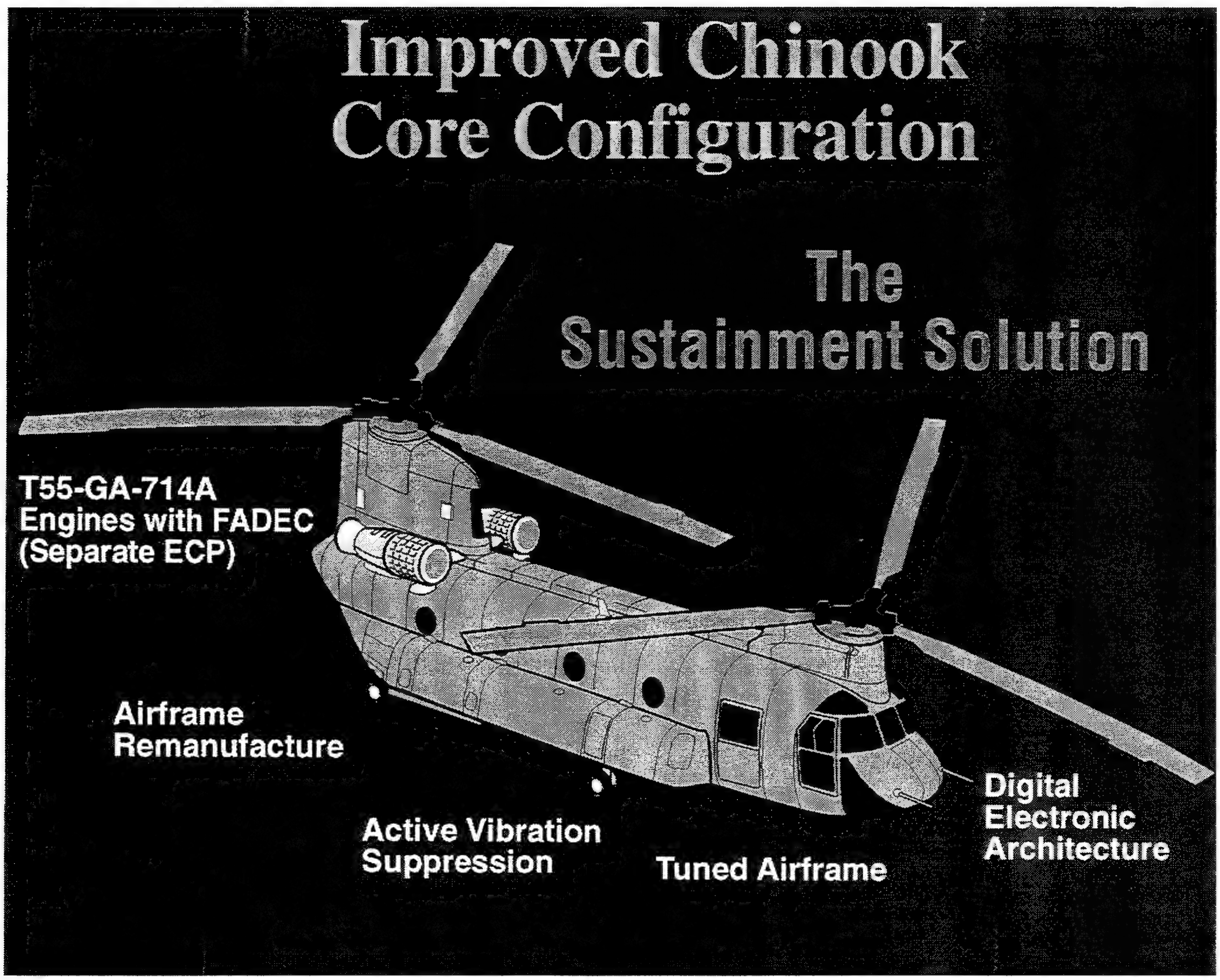
We may also add important new systems to all engines--engine air particle separators (EAPS) to keep sand and debris away from engine intakes, and Full Authority Digital Electronic Control (FADEC) systems to provide optimal fuel control, as well as the Advanced Threat Infrared Countermeasures (ATIRCM), or a

comparable system from Allied Signal to reduce engine exhaust heat signature.

Engine upgrades will reduce operating and support costs by 30 percent and dramatically improve reliability.

We plan to implement this program in FY98 at a proposed cost of about $1.1 billion. The Army will convert more than 1,100 -712 engines to -714A standards, with initial work carried out by Allied Signal until new tooling and test cells are available at the Corpus Christi, TX, Army Depot to install upgrade kits. The -714A enhancements will eventually be included in the -714 engines of the Special Operations Chinook fleet as well. Increased engine performance will give the Chinook greater payload and range capability for the full slate of mission challenges in hot-and-high conditions the CH-47 will meet in the next century.

About the same time, we are proposing to implement a fuselage remanufacturing and improvement program that will involve 300 Chinooks at a cost of around $2.2 billion. We are planning to get under way in FY98, manufacturing four ICH pre-production aircraft by FY01, followed by eight in FY02, 12 in FY03, and 24, our full production rate in FY04. If the JTR program is delayed, we envision modernizing as many as 400 Chinooks to maintain heavy-lift fleet capability beyond 2015.



ICH will include remanufacturing the Chinook fuselage to provide a 20-year life extension. Also, integral to the program is "fuselage tuning," based on research already under way at Boeing, to cut rotor-induced aircraft vibration by as much as 50 percent. Tuning techniques will provide longer Chinook airframe life and increase the life cycles of important components such as cockpit instruments. Lower vibration will also reduce aircraft weight by eliminating heavy vibration absorbers currently in use and cut various operating and support costs as much as 40 percent. Finally, the core ICH program will improve Chinook avionics, providing a MIL-STD 1553B databus, the foundation for installation of integrated cockpit instrumentation, making the CH-47 fully compatible with 21st century weapon systems.

If budget is made available, ICH could also include other improvements in cargo handling, air transportability and rotor hub components. Several technology inserts are already at hand, or soon to be evaluated on the ICH test aircraft, beginning with a winchable external hook system to raise and lower forward and aft cargo hooks. Two synchronized winches with 100-foot cables would enable Chinooks to hover higher for safe loading and unloading of external cargoes. A flip-over floor containing integral cargo rollers would facilitate loading of internal cargo pallets or crates. Finally, installation of quick disconnects at the mating surface between the aft pylon and fuselage would save up to 3400 man-hours now needed to disassemble and reassemble a Chinook before and after C-5 transport.

ICH is an exciting prospect for the Army management team because it will keep a proven aircraft in our rotary wing fleet and provide exceptional capabilities at the lowest possible cost. We look forward to implementing this program to keep the U.S. Army's heavy-lift capability fully operational well into the 21st century, and to ensure that our combined arms team can conduct operations continuously with the best available resources.

WARGAMING MOBILITY AT THE STRATEGIC LEVEL

by
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Science Applications International Corporation
U.S. Army War College
Carlisle, PA

The Strategic Crisis Exercise (SCE) is the capstone educational experience for students attending the U.S. Army War College. Set in the year 2006, the SCE is a fully automated, computer aided exercise which allows the students - lieutenant colonels, colonels, and senior civilians who are from all branches of Service and from agencies throughout the federal government - to apply national and theater military strategies within the framework of the U.S. military's joint crisis action planning process. The exercise objectives include examining both the United States' National Security and National Military Strategies; testing force and strategic lift adequacy for multiple crises; examining reserve component employment issues; and analyzing the four military Services' ability to mobilize, train, and sustain their forces. With a predominantly CONUS-based military structure, the students must analyze the impacts of the United States' strategic mobility assets on their ability and methodology to respond to multiple crises.

To accomplish these myriad objectives the College's Center for Strategic Leadership developed a free-play, political-military exercise which included two major regional contingencies and eight near simultaneous lesser crises spanning the globe. The students are divided into three similar groups and each group devises its own unique approach to the situations it is confronted with. The exercises was conducted over 10-class days with the game itself spanning 230 game days to allow adequate time for planning, mobilization, strategic deployment, and strategic and operational employment. Scenarios were developed for all of the U.S.'s regional CINCs - Atlantic Command (ACOM), European Command (EUCOM), Central Command (CENTCOM), Pacific Command (PACOM), and Southern Command (SOUTHCOM). The scenarios addressed the entire spectrum of military operations from humanitarian assistance and disaster relief through peackeeping/peace enforcement missions to full-scale conventional warfare, including some weapons of mass destruction play. The scenarios were set in the year 2006 and included 2006 force structure, equipment, and doctrine. To provide a plausible backdrop, a World Summary 2006 was written which portrayed the changes that had occurred since 1996 as the world entered an era of knowledge-based economies. The world summary was complemented by a national security strategy and a national military strategy modeled closely on the contemporary strategies but updated to reflect the global political environment in the year 2006.

Players used the Crisis Action Model (CAM) to analyze the impact of these multiple crises on strategic lift capabilities. CAM is an educational tool which is used to deploy forces and supplies to one or more theaters during strategic campaign planning exercises. The combination of supply levels achieved in a theater and closure of particular units will determine whether the campaign plan is supportable. Decisions made by the players include; seaports and airfields to be used by U.S. forces, mobilization of airlift and sealift, apportionment of air and sealift to theaters, days of supplies desired in each theater, and the earliest allowed date for particular units (date for unit to clear airfield or seaport and to be ready for combat). Primary constraints affecting supply levels and unit closure are number of aircraft and ships mobilized, percentage of aircraft and ships apportioned to a theater, time required by the different types of lift to be available after mobilization, and throughput capacity of airfields and seaports (personnel, dry cargo, unit equipment, and POL). Resolution of units was typically at division or brigade-level for ground forces, squadron-level for air forces, and task force-level for naval forces.

Players learned that their Campaign Plans had to be tailored to accommodate the multiple demands being made on strategic lift assets. In some instances they were forced to accept risks in terms of adequacy of supply and types and size of forces. Students were forced to develop creative and innovative solutions to the challenges they faced. There was a great deal of reliance on allies to provide both combat and combat support type forces. Much of the logistics required was contracted or otherwise outsourced. Because of an inability to provide a timely or suitable level of military response, players had to develop diplomatic and economic solutions to problems which might normally have been responded to largely by military means.

The students were able to accomplish their assigned strategic lift missions by relying heavily on assistance from allies and by mobilizing Civil Reserve Air Fleet (CRAF) I and CRAF II assets. Because of the tremendous economic impacts of a CRAF III mobilization, it was not chosen for use by the players. Selected vessels from the Ready Reserve Force (RRF) were used to augment strategic sealift assets. Players were assisted in their transportation efforts by virtually unrestricted overflight and landing rights and uninhibited freedom of navigation.

Plans for future exercises include complicating strategic lift operations by denying overflight rights, limiting the assistance provided by allied nations, and delaying reserve transportation asset mobilization decisions.

GOING PURPLE IN THE COMMZ

by
Mr. James S. Emery
U.S. Army Combined Arms Support Command
Fort Lee, VA

Article reprinted from Army Logistician, September-October 1995 issue.

"...should deterrence fail, the Army's purpose is to win the nation's wars by fighting as part of a joint force of the United States."

Introduction to FM 100-5

FM 100-5, Operations, dated 14 June 1993, is the Army's keystone doctrine; it is the primary doctrine from which all other Army doctrine should evolve. The quotation above is one of the many references in FM 100-5 that indicate that we have long passed the time when a single Service will be committed unilaterally in war or operations other than war. FM 100-5 further states that the Army's warfighting doctrine is "...inherently a joint doctrine that recognizes the teamwork required of all the Services."

With these doctrinal statements in mind, let's explore that portion of a theater commonly referred to in Army terms as *echelons above corps* and in Department of Defense (DoD) terms as the *communications zone (COMMZ)*. (I'll use the DoD term, COMMZ). I believe that doctrine and organizational designs for support operations at this level should be primarily joint. FM 100-5, in chapter 6 where the levels of war--strategic, operational, and tactical--are discussed, seems to support clearly my thesis: "At the operational level of war, joint and combined operational forces within a theater of operations perform subordinate campaigns and major operations and plan, conduct, and sustain to accomplish the strategic objectives of the unified commander or higher military authority" (page 6-2). Notice that there is no discussion of unilateral Army operations.

The development of FM 100-5 was more intensely managed than that of any field manual in recent history. It underwent numerous general officer and subject matter expert reviews. Virtually every paragraph was examined over and over in minute detail. Considering the level of effort in the development of FM 100-5 and the number of times it states directly or indirectly that the Army will always operate as part of a joint force, it would appear that we should be moving more quickly toward the achievement of a joint, *or purple,* condition in doctrine and organizations.

Depending on your point of view, it could be argued that either we are moving quickly toward a joint environment or that we are making no more progress than circumstances demand. Actually, we fall somewhere in the middle. We are moving toward a purple environment at some levels, but we are not moving as quickly as we could, or possibly should, given the thrust of FM 100-5 and the current budgetary situation.

The 12 September 1994 issue of the *Army Times* quoted GEN John Shalikashvili, Chairman of

the Joint Chiefs of Staff, in a speech to the Association of the U.S. Army Institute of Land Warfare, as saying that each Service had done "a magnificent job" of writing warfighting doctrine for itself, but that the business of developing joint doctrine had been "a deep disappointment" to him.

The Army Combined Arms Support Command (CASCOM), Fort Lee, VA, is currently developing a concept for a single Army support command or commander in the COMMZ. The concept involves all combat service support (CSS) and some combat support (CS) proponents, and it will impact both the active and reserve components. The single support command or commander is generally recognized as a good idea for the Army, since it will greatly simplify the support structure in the COMMZ. The left part of the chart at Figure 1 shows a fully developed theater under our current doctrine. The right part shows that same theater under the proposed single-command concept.

The support functions of the theater Army and its subordinate support commands would be consolidated into a single support command in the COMMZ. This support command would have responsibility for area support to units located in or passing through the COMMZ, as well as responsibility for sustainment support of any deployed Army corps or task force. In the single support command in the COMMZ, seven subordinate commands and four materiel management centers (MMC's) would be replaced with one support headquarters and one MMC. The movement control agency would continue basically unchanged but would be subordinate to the support command.

This concept possibly could have an even greater impact if pushed to the next evolutionary level and developed as a joint support command (JSC). A JSC would require the various Services deployed into a theater to link with it for support rather than with a Service-unique command. The JSC could be modularized to an even greater extent than that planned for the Army support command in CASCOM's evolving concept. This would allow the commander in chief to not only deploy the right amount of a particular capability but also to deploy the right Service mix on the JSC staff, depending on which Services are actually employed.

Our most current doctrine seems to suggest that the COMMZ portion of the theater will evolve to some sort of a joint support command, or a loose coalition of joint offices such as the joint petroleum office, the joint mortuary affairs office, and the joint transportation board. If this is true, and I believe it is, it seems rather unnecessary to go through the machinations of forming the separate Service support organizations, only to change them or adapt them to a joint configuration.

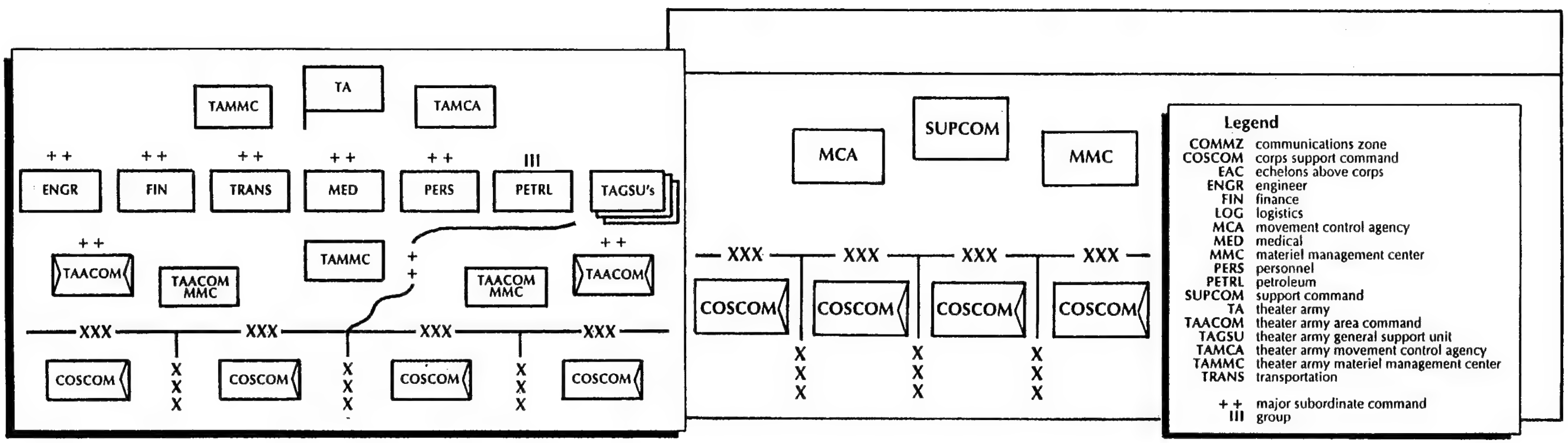
For illustration, theater-building could be compared to a croquet game. In a croquet game, we must go through all the wickets to be successful; however, in theater-building, where time is of the essence, we must bypass wickets that are not absolutely required. Forming Service-unique command and control organizations for support operations in the COMMZ may be unnecessary wickets--wickets that could result in the loss of the game.

Biography

James S. Emery is a logistics management specialist in the Logistics Concepts Directorate of the Army Combined Arms Support Command, Fort Lee, VA. He is a graduate of East Tennessee State University, the Army Command and General Staff College, and the Army Logistics Management College's Logistics Executive Development Course. He has served in division- and Army-level staff assignments as well as on joint staffs.

Figure 1

Echelons Above Corps and COMMZ Logistics



LEAN LOGISTICS: LOGISTICS OF TOMORROW HERE TODAY

by
Lieutenant Colonel Gary M. Melchor
DCS/Logistics, The Pentagon
Washington, DC

The Air Force's worldwide logistics system is undergoing radical reshaping in order to better support operational commanders and their combat units. The collection of initiatives under way to improve logistics performance is called ***Lean Logistics.*** These initiatives are proving that logistics can be simultaneously more effective and more efficient. Lean Logistics was adopted because of its positive impact on operational capability. The ancillary benefits of Lean Logistics are cost savings, manpower savings, a reduced mobility footprint, and a reduction in the time required to make it all happen. Unquestionably, increased combat capability is the driving force behind Lean Logistics.

Air Force Logistics Strategy

Logistics doctrine is moving away from Cold War support structures characterized by massive prepositioning, forward presence, and reliance on large inventories. The revised basing strategy outlines a Continental United States (CONUS)-based force supporting smaller, fast developing Joint operations. These types of operations, contingency, peacekeeping, and humanitarian missions can be seen every day. Considering changes in the operating environment, USAF Logistics strategy underwent tremendous change in the last two years and Air Force's Logistics leaders are constructing a more responsive, more effective system for the future. The new USAF Logistics strategy is grounded on the goals in the *DoD Logistics Strategic Plan.* Those goals are (1) to reduce logistics response time, (2) develop seamless logistics systems, and (3) streamline the logistics infrastructure. The efforts underway in Lean Logistics improve operational readiness by addressing the goals in the DoD plan.

Reducing Logistics Response Times

The Air Force is moving from a supply (inventory)-based logistics system to a transportation-based system. Just as industry has embraced a time-definite method of inventory delivery to dramatically reduce on-hand stocks, the Air Force is leveraging fast logistics cycle times--along with reductions in logistics cycle variability--to shrink stockpiles of our most expensive spares. Reduced cycle time is not just a peacetime windfall. By beginning replenishment early and resupplying throughout combat, our combat units can deploy and operate at the same tempo or higher with less inventory and maintenance capability. This reduction in mobility footprint enables commanders to put more "shooters" into the theater faster while boosting wartime flexibility and effectiveness. Lean Logistics seeks to reduce cycle times in all segments of the repair pipeline. Lean Logistics metrics show the program is on the right track: aircraft avionics cycle times have been reduced from 17 days to about 9 days and over 33 days were cut from the average engine overhaul cycle.

At the five Air Logistics Centers (ALCs), cycle times continue to shrink. The ALCs moved from a negotiated batch repair process for like spares to one that inducts and repairs based on current customer demand. The Radar-Navigation repair shop at Warner-Robins ALC provides a good example of Lean Logistics improvement. WR ALC reported a 52 percent drop in work in progress inventory, and

slashed shop flow days from 20 to 2.8. The Oklahoma City ALC showed similar gains, cutting flow days in the Oxygen Shop from 10 to 6 days. When Air Force Materiel Command (AFMC) completes its command-wide implementation of Lean Logistics, AFMC anticipates inventory levels and shop flow times will continue to tumble.

Developing A Seamless Logistics System

Another goal of Lean Logistics is to produce a system in which logistics information and materiel flows freely throughout the supply chain across logistics functions, between organic and commercial service providers, between combat and support units, and from the shop level up to theater headquarters levels. Information flow resulting from integrated logistics information systems will speed the flow of materiel by streamlining the hand-offs at transportation and functional nodes. It will give logistics managers and users the visibility to "see" assets in the pipeline and react to pipeline logjams. It will also enable logistics managers to assess pipeline performance and develop policies that reduce logistics response times. These improvements will not happen by accident. The Air Force Deputy Chief of Staff for Logistics established an integrated process team to improve the management of existing and developing information systems, and to achieve that integrated flow of materiel and information. The strategy is to ensure logistics information is available to everyone who needs it, no matter where it originated or where it resides.

Streamlining the Logistics Infrastructure

Improved support to fighting forces also means reducing the mobility footprint. Two-Level Maintenance (2LM), the lead program in Lean Logistics, replaces field-level intermediate maintenance capability with a centralized, CONUS-based, time-definite, more responsive repair and distribution system. The net effect of 2LM enables combat units to deploy faster and lighter by eliminating a large portion of the airlift requirement for people and equipment. Fewer personnel are at risk in the combat zone and a key "logistics target" is removed from harms way. Moreover, it reduces our expensive peacetime infrastructure. The continuing logistics goal of "right part, right place, right time" by a different means is effectively achieved. In wargame scenarios, 2LM saved warfighting CINCs 175 C-141 equivalent airlift sorties in a Two Major Regional Contingency scenario. The initial schedule for Air Force conversion to 2LM is nearly complete. Two-level Maintenance already saved $259 million and 4,430 personnel positions. Future savings over the next five years will total an additional 1,672 personnel positions and nearly $800 million.

Lean Logistics: It's About Combat Support!

Air Force units are deployed around the world supporting exercises, contingency, peacekeeping, or humanitarian missions. Sustaining air operations in a high operating tempo environment is quite a challenge; however, Lean Logistics is working today and plays a vital role in maintaining and sustaining America's primary air aim. In addition to improving air operations through Lean Logistics, the Air Force is working more closely with the other Services to improve DoD logistics. Lean Logistics initiatives to improve logistics response time and information management will ultimately result in better support to all Services and, most importantly, to the warfighting CINCs. The drive for flexibility and reduced cycle times has led to innovations in all areas of logistics. Taken together, these innovations are called Lean Logistics.

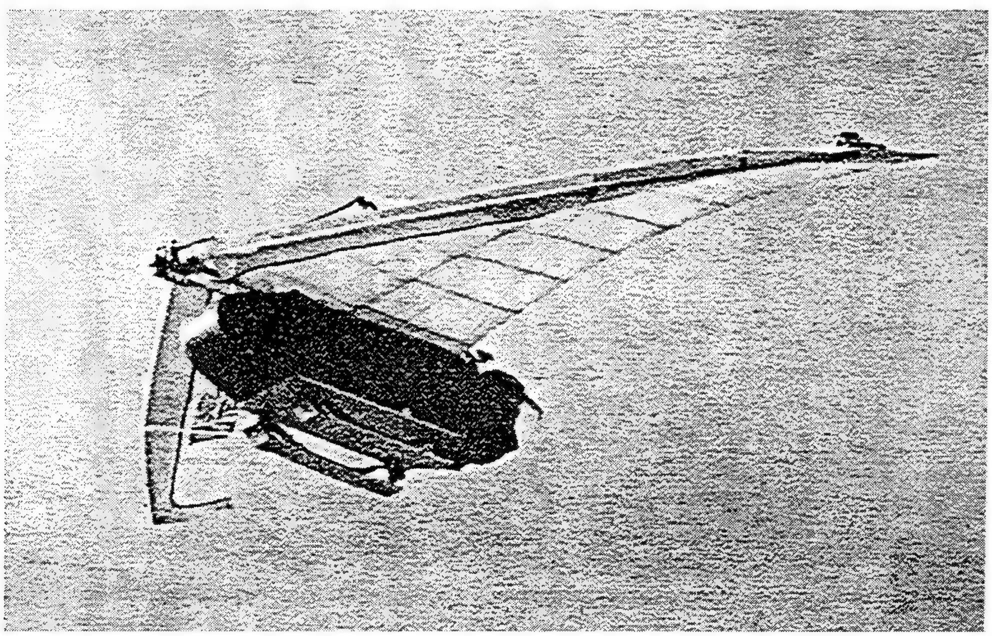
Biography

Lieutenant Colonel Gary M. Melchor is the Transportation Policy Analyst, Lean Logistics Team, Directorate of Maintenance, DCS/Logistics, The Pentagon, Washington, DC. He is responsible for identifying leading-edge transportation concepts and strategies for development and implementation in support of the Air Force Lean Logistics initiative.

NATICK NOTES

by
Mr. Thomas M. Kean
Mobility Directorate
U.S. Army Natick RD&E Center

Semi-Rigid Deployable Wing With Cargo Pod



The Semi-Rigid Deployable Wing demonstrates a cargo delivery platform with longer standoff range and greater accuracy than with conventional parachute airdrop delivery systems.

The Wing has a glide ratio of 6:1 at speeds from 30 to 70 knots, wind penetration, and precision delivery (when coupled with an integrated guidance, navigation, and control system linked to GPS). The structure has an internal rigid frame, enclosed in a ram-air inflated, double-surface sail, that is inflated via a single inlet at the nose of the Wing. Maneuvering is controlled by a wing warping technique using servo actuators. The project will demonstrate a wing with a 30-foot span deployed from a maximum altitude of 25,000 feet, with a 15-mile minimum stand-off, and precision delivery of up to 600 pounds within 100 meters of the target.

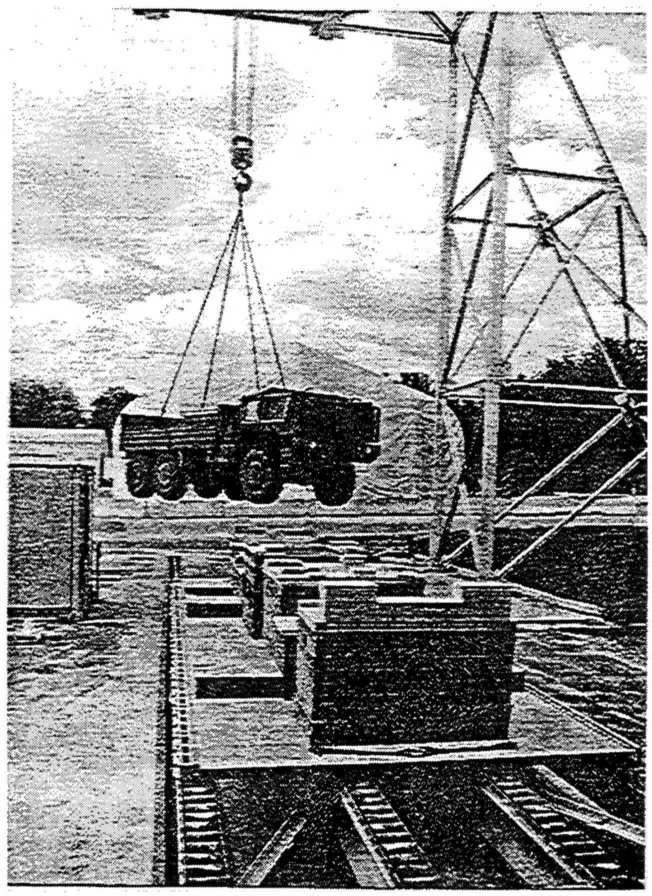
The Wing provides a long stand-off capability which eliminates the need for delivery aircraft

to fly over a defended target or to cross sensitive air borders. Improves capabilities for early entry, peacekeeping, and humanitarian relief operations by providing increased accuracy and the capability to service many ground positions from a single, long stand-off delivery point, reducing the number of aircraft required to support some missions.

The Early Entry Lethality and Survivability Battle Lab is the combat developer and proponent.

Airdrop Certification Program

Before equipment and supplies can be operationally delivered by airdrop, the warfighters must have confidence that the materiel being delivered can withstand the particular stresses of the airdrop environment. Likewise, the airdrop process and the airdrop load itself must not put the crew of the delivery aircraft at risk. To provide safe and reliable airdrop, Natick has established the Airdrop Certification Program.



The major end product of certification of a particular item is a rigging manual, in Army Field Manual form, which provides detailed procedures on how to rig the item for airdrop. Certification also assures that the item to be airdropped has adequate structural integrity.

The certification program is a comprehensive process, using unique capabilities of the Natick Roller Test Facility. Trial rigging procedures developed at Natick are used to rig the item at an Army test site. The item is then airdropped three times from USAF aircraft to verify the trial procedures.

Once an item has been successfully tested and procedures published, Natick issues a certification statement with copies to the Military Traffic Management Command, Transportation Engineering Agency (MTMCTEA). The certification is then incorporated into MTMCTEA's overall transportability report, and becomes an important part of MTMCTEA's transportability approval.

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U.S. Army Infantry School
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U.S. Army War College
24th Infantry Division NCO Academy
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